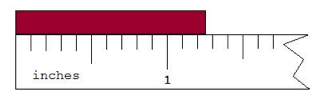
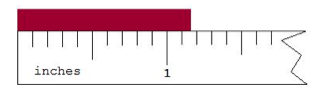
Particle Arrangement, Mass, Volume, and Density. Sig Figs, Metric and Dimensional Analysis

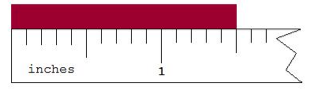
1. Measure the following substances with the correct number of sig figs. State the number of sig figs each number has.



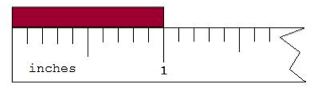
2.



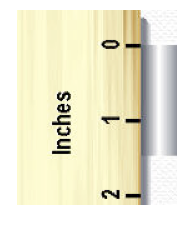
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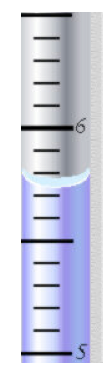
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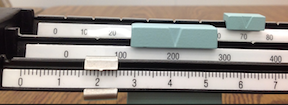
5.



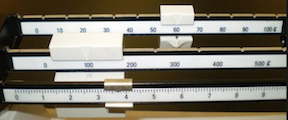
6.



7.

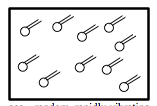
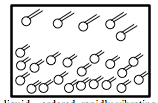
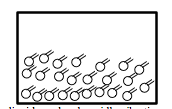


8.

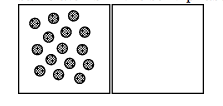


9. Label which phase (or phases) of the substance is present in each of the three pictures.

Describe the arrangement and motion of the molecules during each picture.

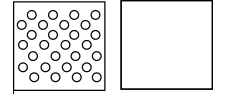


10. If the box at left contains atoms of aluminum in the liquid phase, represent the same atoms in the solid phase in the box at right.



11. How would you represent the atoms of aluminum in the gaseous phase?

12. If the box at left contains atoms of iron in steel wool, represent what the atomic structure of the steel wool after strong heating in the box at right.



13. Draw a picture of a substance that is a solid vs a liquid vs a gas. Compare and contrast these pictures.

14. Draw a picture of a substance that represents an element vs a compound vs a mixture. Compare and contrast these pictures.

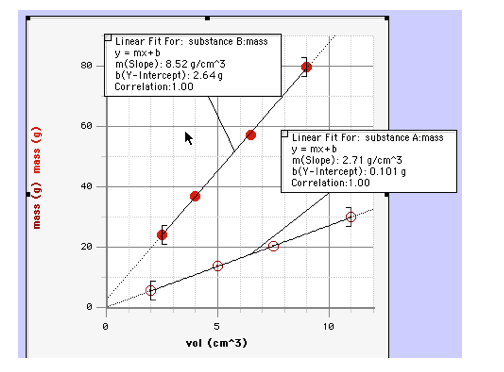
15. Draw a picture of two substances that have the same mass but substance A has a smaller volume than substance B. Compare and contrast these pictures.

16. Draw a picture of two substances that have the same volume but substance A has a smaller mass than substance B. Compare and contrast these pictures.

17. Does substance A or B have the higher density in problem #18? How do you know? Explain

18. Does substance A or B have the higher density in problem #19? How do you know? Explain

19. The 7th period class produced the graph below when they plotted mass vs volume for samples of two substances.



1. (4-2) Based on this graph, how does metal A differ from metal B?

2.(4-2) (3-2) What is the density of metal A? Show all your work and include appropriate units. Will it sink or float in water?

3. (4-2) (3-2) What is the mass of 10.0 cm3 of metal A? Find this in two different ways.

a. Mark on the above graph how you might determine this.

b. Show your work on how you might also calculate this mathematically.

Density

20. Find the mass of 250 cm3  of aluminum that has a density of 2.70 g/ml.

21. What is the volume of mercury, that has a density of 13.6 g/ml and a mass of 350 g?

25. Find the density of a substance whose mass is 250 g and a volume of 32 cm3 . Will this substance sink or float in water?

Explain your reasoning.

If this substance is copper, find the percent error when copper’s theoretical density is 8.70 g/ cm3 .

26. A block of copper has the following dimensions: 50 cm x 2.5 cm x 1.5 cm. It also has a density of 8.70 g/cm3. What is its mass?

29. Round off to the indicated number of significant figures.

1. 808.57 to 4 sf's
2. 808.57 to 2 sf's

d. 0.06372 to 3 sf's

e. 0.06372 to 2 sf's

30. Perform the following operations, expressing your answers to the proper number of significant figures. Write the calculator answer first, then the rounded answer.

Calculator Answer Answer Rounded to sf’s

1. 7.08 x 45.9

b. 4.82

1.732

c. 0.058

72.8

d. 1.327 + 2.22 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

e. 95. 889 - 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

State how many significant digits each of the following numbers have:

a. 3.345 \_\_\_\_\_\_\_ b. 0.00205 \_\_\_\_\_\_\_\_ c. 809006 \_\_\_\_\_\_\_ d. 5000 \_\_\_\_\_\_\_\_\_\_

e. 0.01010 \_\_\_\_\_\_\_\_\_\_ f. 300.0 \_\_\_\_\_\_\_ g. 300. \_\_\_\_\_\_\_\_ h. 300 \_\_\_\_\_\_\_\_\_\_

Dimensional Analysis, Metric

1. 453.6 g = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cg

2. 2,300 mm = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ km

3. 4.8 ft = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm (Hint: 1 in = 2.54 cm)